

## **Remarks**

### **Preliminary Matters**

Claims 27-38, 40-51, and 71-78 are presented for reconsideration. Claims 27, 31-36, 42, and 49 have been amended. Claims 1-26, 39, and 52-70 have been canceled.

References to paragraph numbers in the Specification are taken from the Official Publication hereof, U.S. Patent Application Publication No. 2003-0130831.

### **Rejections Under 35 U.S.C. § 103**

#### **First Rejection.**

Claims 27-38 and 40-51 were rejected under 35 U.S.C. § 103(a) as being unpatentable over "Genesys-MP: User's Guide" (Genie) in view of Saha, "A Simulation Based Approach to Architectural Verification of Multiprocessor Systems" (Saha).

Applicant has amended independent claim 27 in order to more particularly define the invention.

The Examiner has conceded that Genie does not teach "creating a set of tagged-value lists by tagging members of a list of predicted results with a combination identifier which includes a string of literals identifying a particular outcome of said test program". However, he has cited Saha for teaching this element. Applicant respectfully disagrees. In Fig. 2 (page 37), Saha shows a trace of three instruction streams of a multiprocessor system. The instructions have subscripted tags, e.g., "LD<sub>t01</sub>". As Saha points out (page 36, right column, last paragraph), the subscripts indicate "earlier dispatch", i.e. for each processor, the subscript indicates an order of execution of a particular instruction in time relative to the other processors. This is simply a reference to an

on-the-fly trace of resource values and has a different purpose than the combination identifier of claim 27. The combination identifier (tag) according to claim 27 does not designate a time order of execution, but rather references values of a plurality of resources that occur in a particular outcome of the execution sequences, i.e., when the execution has terminated. In Saha the subscript "t01" does not identify the value of the subscripted resources "resulting from the steps of executing said first sequence and said second sequence".

Moreover, one following Saha would not be able to perform the step in claim 27 of "comparing contents...of said mutually dependent non-adjacent resources" (for each combination identifier). Claim 27 recites a "plurality of mutually dependent resources". The combination identifier is required, in claim 27, to tag value-lists containing an allowed subcombination of "one of the mutually dependent non-adjacent resources and the adjacent resources thereof". Furthermore, the combination identifier is required to be common to a plurality of the mutually dependent non-adjacent resources. But each subscript shown in Saha identifies only one resource at the outcome of the sequence. Thus in CPU 0 of Saha, the tag "t07" at the outcome is found only once, and clearly does not reference allowed subcombinations of a plurality of resources.

Furthermore, Saha requires resources to be initialized with unique data. Saha states (page 36, Sec. 2.3):

"In the test stimulus all stores have unique data." [emphasis supplied]

Claim 27 includes the step "initializing said mutually dependent non-adjacent resources". This step clearly differentiates Saha, because the initialization is not limited to unique values.

The scenarios that can be tested by Saha are constrained by the requirement that the stores have unique value. There are no such constraints according to the claimed invention, in which a much larger number of interesting scenarios can be evaluated.

Not only does Saha not suggest a modification of his system to conform to claim 27, but to the contrary, Saha's system demands initialization by "valid sets and the use of uniquely colored data for stores" in order to differentiate the time order of execution, as shown, for example in Fig. 2 (page 35, right column, last paragraph).

Independent claims 42 and 49 have been amended similarly to claim 27. However the limitation "wherein each of the mutually dependent non-adjacent resources has an adjacent resource at a contiguous address therewith" and other references to the adjacent resource were not included, as Applicant believes that these limitations are not required by the disclosures of the cited references.

Notwithstanding the patentability of independent claim 27, dependent claim 37 is independently patentable over Genie and Saha. Claim 37 is directed to generation of instruction generation in the test program. Saha, which describes instruction streams, requires that store instructions be limited so as to "write a uniquely different data value" (Page 36, right column, last paragraph). No such limitation applies to the invention claimed in claim 37, in which instructions can deal with any data.

### **Second Rejection.**

Dependent claims 71 and 73-78 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Genie in view of Saha and further in view of Luo, "Development and Validation of a Hierarchical Memory Model Incorporating CPU- and Memory- Operation

Overlap" (Luo). Luo describes a performance model for memory hierarchies, which in particular, accounts for overlap of processor execution with memory accesses. However the addition of Luo does not remedy the above described deficiencies of the combination of Genie and Saha, as Luo does not deal with tagged value-lists. Dependent claims 71 and 73-78 are believed to be allowable as pending from an allowable base claim.

### **Support for Amendments**

The element "wherein each of the mutually dependent non-adjacent resources has an adjacent resource at a contiguous address therewith" is supported, e.g. at paragraph [0065] of the Official Publication.

The element "initializing said mutually dependent non-adjacent resources" is supported by Fig. 3 (step 48) and the discussion thereof.

The element "identifying a set of value-lists, each value-list comprising a list of elements, wherein each of the elements corresponds respectively to a permissible value of one of the mutually dependent non-adjacent resources and to a permissible value of the adjacent resource thereof" is supported at paragraph [0186].

The element "each said tagged value-list identifying an allowed subcombination of values of all the mutually dependent non-adjacent resources" is supported at paragraph [0227].

The element "upon completion of an execution of said first sequence and said second sequence... comparing contents of said mutually dependent non-adjacent resources" is supported by Fig. 5 and the discussion thereof.

### **Concluding Matters**

Independent claims 27, 42 and 49 as amended are patentable over Genie in view of Saha because these references fail to teach or suggest, as required by the above noted independent claims a combination including iterating over the combination identifiers of a set of tagged value-lists to compare the values in the tagged value lists with those of corresponding mutually dependent non-adjacent resources in order to verify a processor design, in which the mutually dependent non-adjacent resources are initialized by non-unique values.

Several dependent claims have been amended to correct antecedents and to improve clarity.

Dependent claims not specifically mentioned are believed to be allowable as pending from an allowable base claim.

It is believed that the amendments and remarks presented hereinabove are fully responsive to all the grounds of rejection and objections raised by the Examiner, and that the Application is now in order for allowance.

Applicant thanks the Examiner for the thorough consideration of the Application and appreciates the careful analysis of the art cited therein.

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Respectfully submitted,

By: /Suzanne Erez/

Suzanne Erez

Reg. No. 46,688

Phone No. 1-888-260-5928

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IBM Corporation

Intellectual Property Law Dept.

P. O. Box 218

Yorktown Heights, New York 10598